



*"Fire is the
most useful
of all
servants,
the most
fearful
of all
masters"*

—THOMAS CARLYLE, 1843

FIRE PREVENTION IN THE HAM SHACK

BY

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W1HR

FIRE! Sirens wailing through the cool night air, the staccato of unmuffled engines punctuating the urgency as trucks dash to the scene; the victims huddling in their night clothes as the flames dance against the blue-black sky. By dawn all that remains is a smoking hulk. What yesterday was a home full of laughter and warmth is today a ruin of ashes and debris. Fire, that most fiendish of all nightmares, has struck again.

Every year fire causes billions of dollars of property damage and leaves thousands homeless, and of the many house fires reported daily in the newspapers, a large percentage have electrical origins: overloaded electrical circuits, poor connections, faulty wiring, lightning — practically all could have been prevented, but the precautions are so simple they are often overlooked.

As a matter of fact, when was the last time you made a fire-safety check? If you're like most amateurs, it probably never occurred to you that you should even make such a check, yet wherever there is electrical or electronic equipment, there's the chance of fire, and if your ham shack is like most, it's probably full of radio and electronic gear.

A fire in your ham shack is always likely to be or to become an electrical fire, and there are always other fire-prone materials around a busy shack to fuel the flames once they get started. Let's look at some of the most common hazards, and work up a fire-safety check list for the future.

Electrical fires

First, exactly what is an "electrical fire?" Well, it almost always begins with an arc. When insulation breaks down or the applied voltage is too high for the insulation, an arc occurs. And the temperature of an arc, even a tiny one, can be a thousand degrees or more. The heat can melt ordinary

insulating materials, crack ceramic insulators, char printed-circuit boards, and raise havoc in general.

Continued arcing can carbonize insulators, turning them into good conductors; carbon encourages the arc, which gets hotter, carbonizing more of the insulator, and on and on. The heat melts insulation on nearby wiring which eventually breaks down, causing even more arcing. If there's any flammable material nearby, you're going to end up with a real conflagration; at the very least you're going to have a mess on your hands. If you can stop the arc as soon as it gets started, however, the equipment will easily keep its own cool. Fuses are designed to do exactly that.

Fuses

The best way to stop any fire is to keep it from getting started. What that boils down to in electrical fires is to provide fuse protection for all the electrical equipment in your ham shack. Some hams seem to have the idea that, "What the heck, it's only 110 volts," but what they have forgotten is

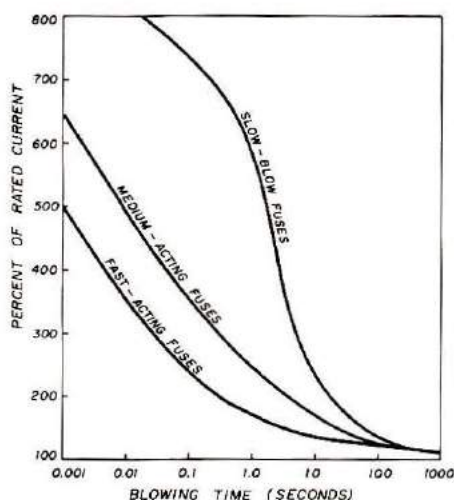
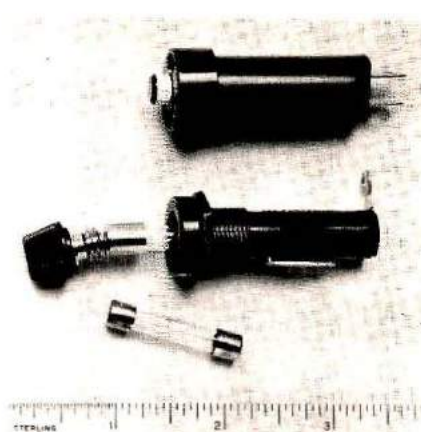


Fig. 1. Graph showing relationship between fuse flowing time and per cent of rated current for three types of fuses. Fast-acting fuses are normally used to protect sensitive instruments; medium-acting fuses are used in most electronic equipment; slow-blow types are used in equipment which has high starting currents such as electric motors and heavy-duty power supplies.



The Heinemann Electric *Re-Cirk-It* (top) protects electronic circuitry like a fuse (bottom), but can be reset. It is designed to be installed in the same panel space as a conventional fuseholder. The *Re-Cirk-It* is available with current ratings from 0.25 through 10 amperes (photo courtesy Heinemann Electric Company).

that 110 volts has all the current it needs to burn your shack to the ground — and it's the current that makes an arc so hot and destructive. Remember that an arc welder uses relatively low voltage but the 100 amps or more that flow through its electrodes can melt steel!

Fuses are affected primarily by current; the voltage rating printed on the fuse is put there so you won't use it in a circuit where the voltage is so high that an arc could form across the fuse after it has blown. When electronic equipment is properly fused, the fuse will carry the normal load but will open up instantly when there is a serious current overload (such as that caused by an arc).

Fast-acting fuses which will blow in a few seconds with as little as 150 per cent of the rated current are commonly used to protect radios and electronic instruments; slower acting "slow blow" types are used in equipment which has heavy starting currents such as electric motors and capacitive input power supplies. Both types, however, open up almost instantly when there is an overload of 200 per cent or more (see **Fig. 1**).

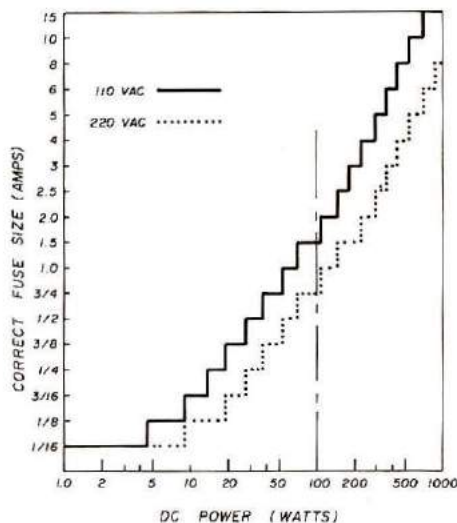


Fig. 3. Chart for choosing the correct fuse for 110 and 220 Vac power, based on the dc power in watts. Electronic equipment which has a total power dissipation of 100 watts, for example, requires a 1.5 ampere fuse if powered by 110 Vac; the same equipment would require a 3/4 ampere fuse if powered by 220 Vac.

If you have any doubt as to the correct type of fuse you should be using in your equipment, check the instruction manual. Don't depend on the fact that the fuse in the equipment is the right one — a previous owner may have substituted a larger fuse simply because he didn't have the correct one on hand.

A few years ago, when I was checking out a high-voltage power supply I picked up at a local flea market, I discovered the ham I bought it from had soldered a wire directly across the fuse holder! When I removed the jumper and installed the correct fuse, it blew instantly when I turned on the power. Some troubleshooting revealed a minor problem with the surge protection circuit, which in itself would not likely cause a problem, but the bypassed fuse holder was a serious safety hazard if it had gone undetected. The previous owner could have found the source of the problem if he had only looked for it, but it was

apparently more expedient to simply bypass the protective fuse!

Some electronics equipment, particularly that designed for commercial and military applications, uses circuit breakers instead of fuses. There are many types available, including small chassis-mount circuit breakers with ratings from 500 mA up to 20 amps. Although the initial cost of circuit breakers is higher than that for fuses, breakers have the advantage that you don't have to keep a supply of spare fuses on hand. Also, some circuit breakers are designed to serve double duty as the equipment's ON/OFF switch.

Here, then, is the first item for your fire-prevention check list: Make sure every piece of equipment in your ham shack, right down to the soldering iron, is protected by a fuse or circuit breaker of the right size. When you build a piece of equipment, even a kit, make sure it has a protective fuse. All too many pieces of homebrew radio gear have no protection at all, or not enough.

Fig. 2 shows several ways to fuse electronics equipment. For equipment that is powered

by 110 Vac, you need a fuse only in one leg of the primary, **F1** in **Fig. 2A**; the secondary fuse at the center-tap of the transformer (**F2**) is sometimes included but it's not required if the primary fuse is properly chosen. If the fuse at the center-tap is the only one in the unit, another fuse should be installed in the primary circuit — the secondary fuse doesn't provide protection against a shorted winding in the transformer, and it's foolish to rely on the house fuses.

If the equipment is powered from 220 Vac, there should be a fuse in each of the primary legs as shown in **Fig. 2B** (don't put a fuse in the neutral). You may also want to place a fuse in the B+ line (**F3** in **Fig. 2B**) to protect the rectifiers from a shorted filter capacitor, but make sure the voltage rating of the fuse is adequate.

To properly fuse a piece of equipment you only have to know one thing: how much current the equipment requires for normal operation. Most amateurs don't have instruments to directly measure ac current or power, but if you have a multimeter you can measure dc voltage and

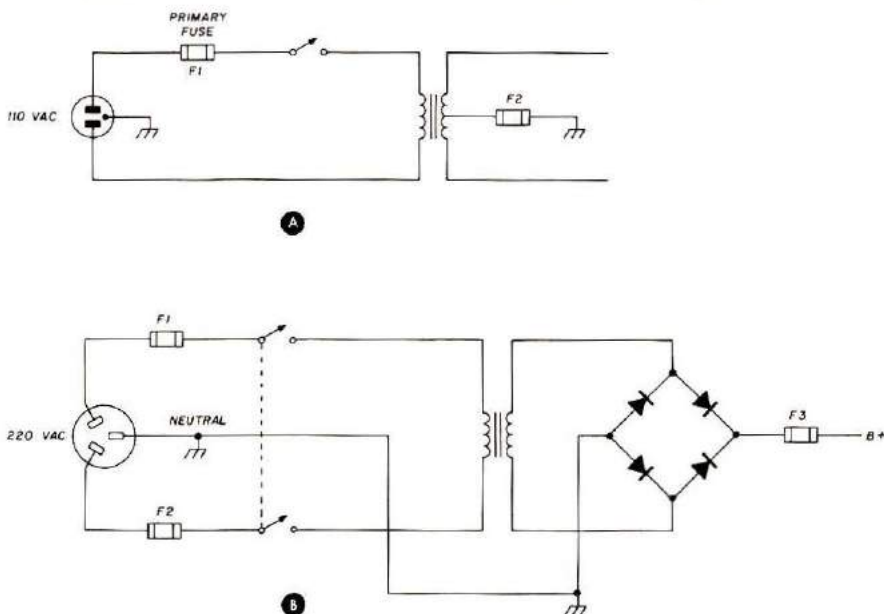


Fig. 2. Correct methods of fusing power supplies. If the supply is powered from 110 Vac, it's necessary to fuse only one leg (**F1** at **A**). The fuse at **F2** is not required if **F1** is properly chosen. If the supply is powered from 220 Vac, a fuse should be placed in each leg as in **B** (no fuse should be placed in the neutral). Fuse **F3** is used to protect the rectifiers against a shorted filter capacitor but is not required for safety purposes.

current, and that will give you all the information you need.

For example, if your two-meter fm rig requires 3 amps at 12 volts during transmit, that represents 36 watts (3 amps times 12 volts = 36 watts). To determine how much ac current is required when using an ac power supply, simply divide 36 watts by 110 volts (or 220 in the unlikely case you're using a 220 Vac transformer). The answer is about 0.33 amp. Add about 50 per cent safety factor and select the nearest value fuse; for this application you need a 0.5 amp fuse.

If you're unsure of your math, you may wish to use the simple graph in Fig. 3. Once you have calculated the dc power in watts, this graph will tell you what size fuse you need in the primary leads for either 110 or 220 Vac.

If you have some radio equipment that needs a fuse, but the chassis is so crowded there's no place to install a fuse holder, you can use a fuse plug which is installed on the line cord. These plugs have built-in clips for a pair of glass cartridge fuses. To replace a blown fuse you have only to push it out with a toothpick and install the new fuse.

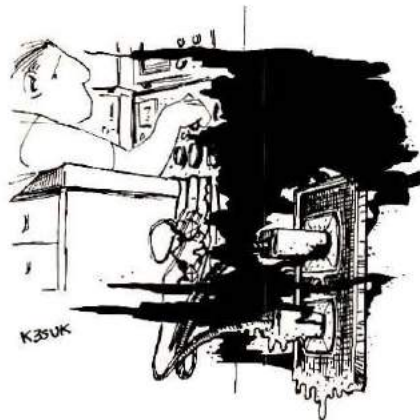
House wiring

Another important factor in fire safety is the ac wiring in

your house. If you live in a house that was built more than 25 years ago, take a few minutes to look over the ac wiring. The fixtures, outlets, and switches used then weren't as good as those used in modern construction and, besides, they're 25 years old. Wall outlets and receptacles used to be rated at about 600 watts, which isn't very much by today's standards; plug in a big transmitter, a receiver, and a soldering iron, and you're asking for trouble . . . the contacts, which were designed for 5 amps if they're bright and clean (which they're not), get hot; this makes them tarnish, which makes them hotter, which increases the resistance, which makes them hotter, and so on and on . . .

Modern electrical outlets have a minimum rating of 15 amps or about 1600 watts and you can get 20-amp types for practically the same price. But don't install 20-amp receptacles unless your house is wired with no. 12 (2.1 mm) wire. Many older homes were wired with no. 14 (1.6 mm) which will safely handle only 15 amps, maximum.

If you have a big rig, say 1000 watts, plus a good-sized tube-type receiver, they're going to draw a fair amount of current from the ac line. The transmitter alone may use 2000



Plug in a big transmitter, a receiver, and a soldering iron, and you're asking for trouble...

watts of power or more; the receiver takes another 150 to 200 watts. To that you must add the power required for any accessories you may be using — an electronic keyer, monitor scope, external vfo, or vhf fm transmitter. For a well equipped amateur station the total power requirements can easily exceed the capability of the no. 14 (1.6 mm) power line.

If you have only one electrical outlet in your shack, you may want to add another, but don't start your new wiring at an existing outlet box. That's worse than foolish — it's dangerous. If you tap into a wall outlet that happens to be at the end of about 50 feet (15 meters) of no. 14 (1.6 mm) wire, you can heat up the wire with the overload and cause a serious fire hazard.

If you want to add electrical outlets to your ham shack, go all the way back to the main circuit breaker or load center and start your wiring from there. But don't even consider doing it yourself unless you know exactly what you're doing. An electrical contractor will do the work for a nominal fee and he has the equipment to "snake" new wiring through existing partitions with a minimum of fuss.

You should also keep in mind that many communities have building codes which require that all electrical wiring must be done by a licensed

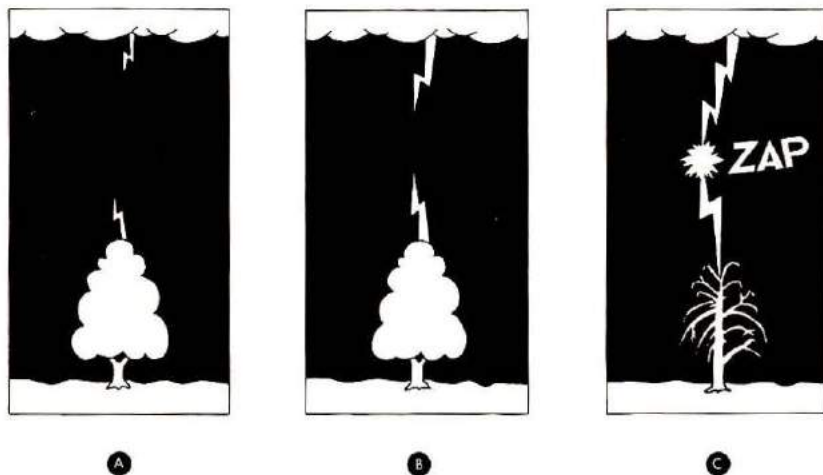


Fig. 4. Lightning strike begins to form with charge filaments extending both from an object on ground and a thundercloud, A. As the charge builds, the filaments lengthen and become more pronounced, B. When the two charge filaments meet, C, thousands of amperes are discharged in a blinding flash.



Cushcraft Blitzbug® can be inserted in coaxial feedline to antenna. The shell is grounded to a good earth ground. Inside the "bug" is a gap that conducts high-voltage surges to ground without in any way interfering with transmission or reception.

electrician. Furthermore, if you have a fire which is caused by electrical wiring which doesn't conform to the code, you may have trouble collecting from your insurance company!

If your transmitter runs more than about 500 watts input, I recommend that it be powered from 220 Vac. Most modern high-power equipment can be wired for either 110 or 220 Vac — the instruction manual will show you how to change the taps on the power transformer to make the change. If you don't have a 220-volt line coming into your shack, you can have the electrician install one at the same time he's putting in your additional outlets.

Lightning hazards

Lightning is one fire danger you can't always do a whole lot about. That tower outside your shack is a good lightning rod, so you're apt to get a shot once in a while. Nevertheless, there are several precautions you can take to keep the hazard to a minimum. As an added bonus, a tower or antenna system that is properly protected actually acts as a "shield" against direct lightning strikes to your house.

The basis of all lightning protection is to keep the hot stuff outside the building and shuttling it to ground as

quickly as possible. Number 1 on the list is a good lightning arrester. You can't actually "arrest" lightning, but you can steer it to ground so it won't set your house on fire. An arrester carries the energy off to ground by providing an easy path for it; therefore, the connection from arrester to ground must be short, heavy, and direct — a ground wire that is too small will simply vaporize if it gets a direct hit. The minimum recommended size is no. 6 (4.1 mm) stranded copper, which can be purchased in short lengths from electrical supply stores.

Don't depend on the cold-water pipes in your house for a good ground. For one thing, the object is to keep the effects of a lightning strike *outside* your house; grounding to the house's plumbing system is an engraved invitation for it to come inside.

If you're one of the few amateurs who has an extensive system of ground radials for a vertical antenna, you can use that for your lightning arrester ground. If not, buy an 8-foot (2.5 meter) ground rod from your local electrical supply house and drive it all the way into the ground.

If you use coaxial transmission line, one of the

best lightning arresters on the market is the Cushcraft *Blitzbug* shown in the photograph. This little gadget has a small spark gap inside which bleeds off static charges before they become large enough to cause damage to your rig (or start a fire).

Although it's not too well known, a lightning bolt doesn't originate only in a thundercloud. Studies with high-speed photography have shown that a lightning strike actually consists of two charge filaments; one originating at ground level, the other at the thunder cloud as shown in Fig. 4. If the static charge at ground level is dissipated before it becomes large enough to extend a filament into the sky, the lightning will seek some other spot to strike. The best arresters are those that dissipate the static charge before it's big enough to cause serious damage.

If you use open-wire transmission lines, you can build a simple but effective lightning arrester as shown in Fig. 5. Don't skimp on the material you use for the gap conductors — it should be a minimum of 1/8 inch (3 mm) thick and a good conductor such as copper or aluminum. An easy way to get the copper

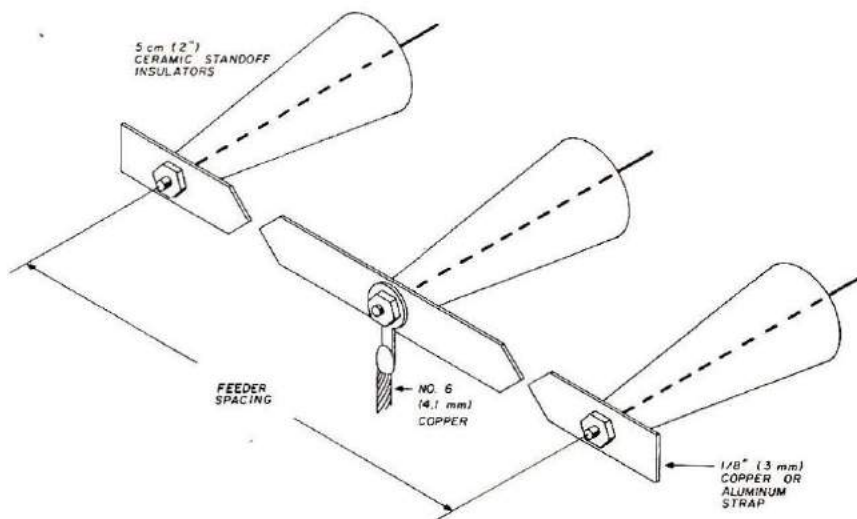


Fig. 5. Simple lightning arrester for open-wire feedline. The slots in the two outside electrodes allow for gap adjustment (adjust for minimum gap spacing which permits maximum transmitter power without arcing). The no. 6 (4.1mm) copper cable is run directly to ground. Large ceramic standoff insulators are available from Fair Radio.*

*Fair Radio Sales Company, Post Office Box 1105, Lima, Ohio 45802. Ask for a copy of their latest catalog.



As a minimum, use an 8-foot ground, driven all the way in.

is to ask your friendly plumber for a scrap piece of copper water pipe (you need a piece no longer than 30 cm or 12 inches); pound it flat with a hammer or mash it in a vise. Adjust the gap spacing to the minimum that will prevent arcing when you're running full power.

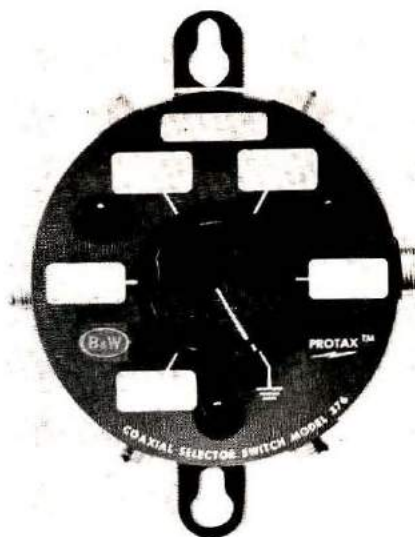
It's also a good idea to install a grounding switch to disconnect your transmitter and receiver and ground the antenna when you're not around. If you use coax cable, Barker & Williamson manufactures *Protax* antenna switches which function as regular antenna selector switches but have one position which automatically grounds the entire antenna system when the rig is not in use.* For open-wire transmission lines a wide-spaced knife switch can be used.

Even with all these precautions, a direct hit can wander all over your incoming wires. To minimize the chances of a fire's starting, run all transmission lines well away from wooden walls, drapes, and other flammable materials. Even coaxial cable can get very hot if it's carrying a lightning surge; the intense heat can actually bring the center insulating material to a boil — the cable bursts under the resulting pressure. I've also

seen cases where the coaxial line welded itself to the side of a tower during a direct lightning strike.

Many people don't realize it, but there's an amazing amount of energy floating around on the ac power lines during electrical storms. There have even been cases where damage has been reported a mile or more from a strike to a power pole. Since the high-voltage surges enter the service entrance and seek the least resistance path to ground, all too often that path is through your carefully grounded amateur equipment. Television sets, electric stoves, hot-water heaters, and house wiring also fall prey to service entrance lightning and many bad fires have been caused by it.

In most cases, if the surge is large enough to cause damage, the circuit breakers in the junction box will pop open. Unfortunately, they don't open up instantaneously so the lightning surge is already on its way to ground (through your precious ham gear) by the time the breakers let go. There's an inexpensive solution to this



The *Protax* rotary coaxial selector switch manufactured by B&W provides one switch position which automatically grounds all incoming transmission lines. Two models are available; the model 376 shown here with the connectors on the side, and the model 375, which has the coaxial connectors at the rear.



Don't forget your soldering iron . . . it gets plenty hot.

problem in the form of a small, low-cost lightning arrester which is similar to the large units used at electrical substations. Both General Electric and Westinghouse manufacture these devices. The General Electric 9L15CCB007 home lightning protector, for example, costs about \$12.00, can be installed at the service entrance or inside the main breaker panel, and is guaranteed for a minimum of ten years.

Diverse fire dangers

Watch the common things you're apt to forget — such as your soldering iron. It gets plenty hot, so put it in on a heavy stand that can't tip over. A holder which has a screen or mesh cover is best. Keep cleaning rags, scratch paper, and other flammable materials away from the iron — I'm sure you've had an experience where you charred a schematic or a page in the *Handbook* with a carelessly placed soldering iron. If you're a good housekeeper, you'll be much more fire safe.

Now and then you have to use chemical cleaners around the ham shack; switch contacts and potentiometers get dirty and require periodic maintenance to keep them working to perfection. Be sure the cleaner you use is fireproof.

*Available from G. R. Whitehouse & Company, 15 Newbury Drive, Amherst, New Hampshire 03031.

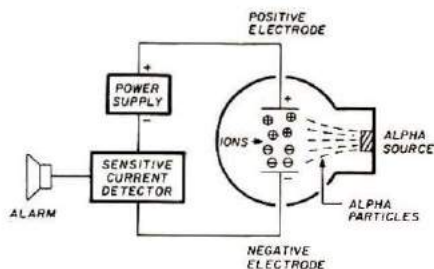


Fig. 6. Ion chamber smoke detector. Alpha particles ionize the air in the chamber, causing an electrical current flow between the electrodes. Combustion particles reduce current flow, which is sensed by the detector, triggering the alarm.

Nobody in his right mind would use gasoline for this task, but lighter fluid can be nearly as dangerous. Carbon tetrachloride, once popular for cleaning electrical parts, is fireproof, but the vapor can make you pretty sick. The safe stuff is available in spray cans — and it does a better job as well!

If prevention fails

I've mentioned the most likely causes of fire in your ham shack, and how to keep them from starting a blaze, but what do you do if you're suddenly faced with a fire anyway? Easy, grab your fire extinguisher and pour it on — but be sure you grab the right kind of extinguisher; the wrong one can get you killed!

Note that fire extinguishers are rated for three classes of fires, so be sure you choose the correct type of extinguisher. Fires are classified as follows:

Class A fires. Include burning wood, paper, etc., where dousing with water or insulating by multipurpose dry chemical will extinguish the blaze.

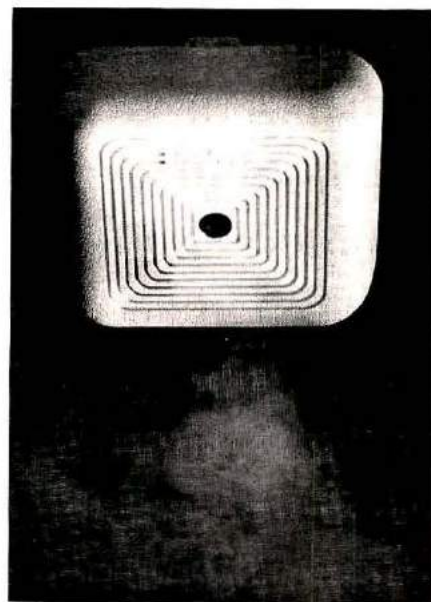
Class B fires. Consist of burning flammable liquids such as gasoline, paints, or cooking fats where smothering action is required to put out the fire.

Class C fires. Occur in electrical equipment such as

radios, appliances, or motors where the extinguishing agent must be a non-conductor of electricity.

If there is any electrical hot stuff in or near the fire, and there probably will be, DON'T use soda-acid, foam, carbon tetrachloride, or freon fire extinguishers. The soda-acid types are those brass-colored extinguishers you see hanging on the walls with a hose on top; you turn them upside down to spray the fire. The solution in them is mostly plain water so you can figure out what happens when a stream of conductive water hits high voltage and you're hanging onto the metal case . . .

The foam extinguishers also contain water mixed with special chemicals; don't use them on electrical fires. Carbon tetrachloride is a very good fire-extinguishing fluid but when it strikes a hot fire, it turns into phosgene gas, which is a deadly poison; Freon, a popular ingredient in small home extinguishers, has the same problem as carbon tet — while non-toxic at room temperature, it breaks down into phosgene gas when it strikes a hot fire. If used on a fire in a small room,

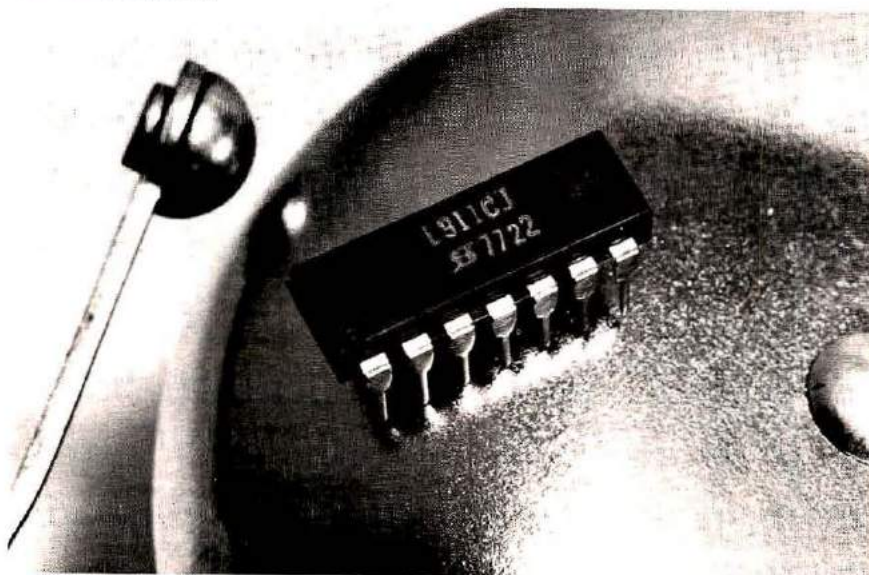


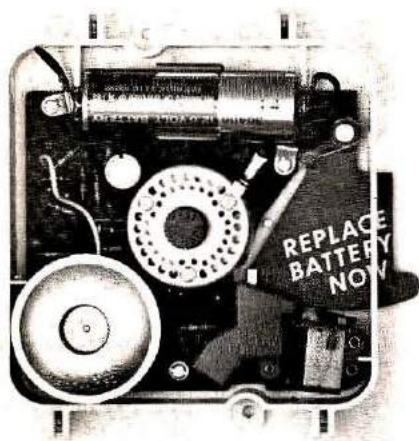
GE's Home Sentry smoke alarm sounds the alarm before appreciable smoke is present — at the earliest stages of a home fire — while there's still time to escape. Test button allows testing of the entire system (not just the alarm). This reliable alarm system is available in ac wired-in, corded, and dc battery-operated models (photo courtesy General Electric).

both carbon tet and Freon can put you off the air, permanently!

There are two types of extinguishers recommended for electrical fires: CO₂ and dry chemical types. The best known of these is the CO₂ "fog

The Siliconix L911 detector IC is at the heart of many modern alarm systems. It is the latest addition to a line of solid-state devices which includes the Siliconix SM110 smoke detector IC.





Interior view of GE's Home Sentry smoke alarm showing the ionization chamber, center, alarm bell, lower left, and battery, top. When the battery ages and is no longer able to provide reliable operation, a spring-loaded REPLACE BATTERY flag is released from the side of the cover (photo courtesy General Electric).

bottle" which smothers a fire by keeping it from getting enough oxygen to burn. It is harmless to humans and doesn't leave any residue — some types of extinguishers leave a mess that's more damaging than a small fire (assuming, of course, that the small fire doesn't grow into a complete conflagration).

The second type of extinguisher recommended for electrical fires is the dry-powder type. The better ones are pressurized and will spray several pounds of powder 3 meters (10 feet) or more. In lower cost extinguishers the powder is packaged in long paper tubes; you tear off the powder cap and dump the powder on the fire. This is fine for small fires, but the pressurized extinguishers are more effective.

Dry chemical extinguishers which are recommended for Class B and Class C fires (burning liquids and electrical fires) use plain bicarbonate of soda as the fire snuffer; however, this type of extinguisher isn't very effective in putting out fires involving wood, paper, or plastics (Class A fires). Extinguishers which

are recommended for all types of fires are charged with a monammonium phosphate based dry chemical; this type of extinguisher is slightly more expensive but gives better all around protection.

You can buy these extinguishers in 1- and 2-pound capacities at department stores, but they're not recommended — the very minimum size you should purchase for home use is 2 3/4 pounds. If you ask your local fire chief, he'll tell you the best sizes are the 5 and 10 pounders; these will completely put out most fires, even if they get a good start.

Note, when you're comparing fire extinguishers, that they are rated for the three classes of fire. The larger the rating number, the more effective it is on the class of fire indicated. Following are typical ratings for 5- and 10-pound dry-chemical types:

Type	Rating	Approximate Range
5 pound (2.3kg)	1-A 5-B:C	13 feet (4 meters) for 10 seconds
10 pound (4.6kg)	(2-A 40-B:C)	18 feet (5.5 meters) for 10 seconds

Fire alarms

If you're in the shack when a fire starts, you can combat it right away, but if something heats up while you're away, it's a whole different story. Daily, there are newspaper accounts of people who died while asleep because they had no warning that a fire had started. Because of the great number of such incidents, smoke and heat detectors are becoming mandatory in many new and remodeled homes; all new homes insured by the FHA or VA are required to have them. Although many people apparently consider these devices an unnecessary expense, they can reduce the

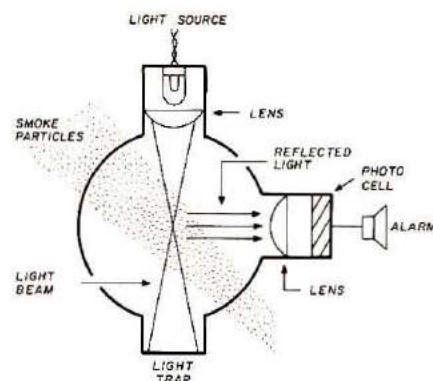


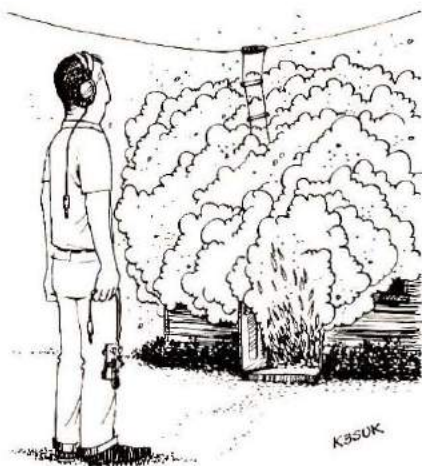
Fig. 7. Photo-electric smoke detector. Smoke particles reflect the light onto the sensitive photo cell, which sets off the alarm.

many deaths caused by smoke asphyxiation or toxic gases from home fires.

The National Fire Protection Association (NFPA) has observed that in nearly all fires detectable quantities of smoke precede detectable heat. In addition, slowly developing fires such as those caused by overloaded electrical circuits seldom increase room temperature, but they nearly always release toxic gases such as carbon monoxide. Many of the new synthetic materials found in homes (such as plastic insulation on wiring and PVC plumbing) produce deadly gases as they burn. For this reason the NFPA recommends that a home should include at least one smoke detector in the fire protection system.

There are three types of smoke detectors presently available: ion chamber, photo-electric, and semiconductor. In the ion chamber detector, Fig. 6, a source of alpha particles ionizes the air within a sensing chamber. When combustion particles enter the chamber the ions attach themselves to the particles and the current flow is reduced. The alarm is activated when the current flow falls below a predetermined value.

In the photo-electric smoke detector, Fig. 7, a light beam shines across the sensing chamber into a light trap on the



Some ham shacks are disasters waiting to happen . . .

opposite side. When smoke enters the chamber, light reflected by the smoke particles is detected by a photo cell. When the voltage output from the photo cell reaches a preset value, an alarm is sounded.

The semiconductor gas detector uses a crystal with a metallic oxide coating. Combustible gases near the crystal reduce its electrical resistance and trigger an alarm. Unfortunately, any flammable gas in the home — alcohol, perfume, cooking smoke — can also set off the alarm. Tests have also shown that semiconductor smoke detectors do not respond to fires which are burning with little smoke. For these reasons, the semiconductor gas detector is not as good for home use as the ion chamber or photo-electric types.

In general, if the fire is a slow and smoldering one, without flame, the photo-electric sensor will respond faster than the ion chamber; if flaming is present the ion chamber detector is faster. Either detector can be used for early fire warning detection, however.

Practically all of the smoke detectors on the market can be operated from battery power; some types can also be operated with 120 Vac. Ac

powered units are very convenient, and since the power almost never fails before the detector would sound an alarm, ac types are very popular. Almost no maintenance is required on any of the units, but don't forget to replace the batteries every year. You may also have to replace the lamp in the photo-electric sensor after 4 or 5 years.

The basic level of protection recognized by the NFPA (called Level 4 protection) requires a smoke detector in each sleeping area and at the top of each stairway leading to an occupied area. Only one smoke detector would be required in small single-story homes with clustered bedrooms and no basement. More complete protection (called Level 1 protection by the NFPA) requires smoke detectors in or near each sleeping area, and at the top of the basement stairs;

in addition, every room must be covered by a smoke or heat detector.

Summary

There are a surprising number of potential fire hazards around the average ham shack: unfused equipment, poor grounding, ineffectual lightning protection (or none at all), overloaded electrical circuits, papers scattered over the operating desk, no fire extinguisher in sight — each is a disaster waiting to happen.

Take a minute to go over the fire check list on this page, then take it into your ham shack and check each of the listed items. When you find something that doesn't measure up, add the needed protection. It won't take long, it won't cost much, and your peace of mind will more than make up for it.

HRH

FIRE PROTECTION CHECK LIST

Electrical

1. Is all your equipment properly fused?
2. Is all the wiring heavy enough to carry its normal load without overheating?
3. Are all the electrical outlets and switches in good shape — not dirty or loose?
4. Is your radio gear fully protected by a suitable lightning arrester?
5. Do you have a good grounding system?
6. Do you have a grounding switch in your transmission line?
7. Is all your equipment properly grounded?
8. Are your fire extinguishers the correct type for use on electrical fires?
9. Are smoke detectors installed and checked?

Housekeeping

1. Is your ham shack neat and clean?
2. Are papers, old magazines, and other flammable items stacked around in corners?
3. Even worse, are they stacked on top of hot electrical equipment?
4. Is your soldering iron protected against paper or rags falling on the hot tip?
5. Is the wastebasket made of fire-proof metal or of meltable plastic?
6. Is the wastebasket full, running over, or kept nearly empty?
7. If you smoke, how are the ash trays? Full? Clean? Big enough for a long rag-chewing session?